

SOME CONSTANTS OF TOAD FAT

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The giant toad, *Bufo marinus*, has become one of the more abundant amphibian species of Puerto Rico since its introduction there more than 30 years ago. It seemed, therefore, the suitable material for a continuation of the author's investigation of amphibian and reptilian fats (Fromm *et al.*, 1954). The pooled fat bodies or livers of animals of both sexes were used either immediately after dissection of the toad or after several days' storage in the freezer. The organs were freed of all adhering tissue, washed free of blood with distilled water, ground with plaster of Paris, and extracted with ethyl ether in a Soxhlet apparatus. Both fats were semisolids, the adipose fat being a cream-colored, the liver fat a brown substance.

The fat constants were determined by the methods used in the study of caiman fat (Fromm *et al.*, 1957), but the saponification value of the liver fat was obtained by Kehren's semimicro method (1952). The amount of nonsaponifiable matter was found by petroleum ether extraction of the saponified fat as described in the work on caiman fat, but for comparison with earlier results (Fromm *et al.*, 1954), ethyl ether extraction of the saponified whole liver was also applied.

TABLE I
Constants of the fat of Bufo marinus (average values)

Organ	Yield % of Organ	M. P. °C.	n _D ²⁰	Saponification Value	Iodine Value	Nonsaponifiable % of Fat
Fat Body	67.3	33	1.475	205.3	58.0	0.74
Liver	7.3	32	1.465	192.4	40.9	1.12

The results are summarized in table 1. The nonsaponifiable matter of the liver fat amounts to 0.06 percent of the liver weight. Previously, it was reported that the nonsaponifiable of the toad liver was 3.2 percent of the liver weight. It was already pointed out at that time (Fromm *et al.*, 1954) that this value was probably too high and caused by ethyl ether extraction of soaps and other material from the saponified liver. This was confirmed by saponifying an equal amount of the same pooled livers as used for the preparation of the oil and extracting it with ethyl ether. The supposed nonsaponifiable in this case amounted to 2.4 percent of the total liver weight, but it was only partially soluble in petroleum ether and gave on repeated resaponification and extraction smaller and smaller amounts of nonsaponifiable. Unfortunately, an accidental loss of the material prevented the final determination of the nonsaponifiable in this way.

The high melting point of both fats is interesting as an effect of the tropical habitat on fat composition and confirmation of the Henricke-Hansen law (Bělehrádek, 1935). The relatively low iodine value corresponds to this high melting point and contrasts with the few data reported for toad and frog fat collected in the temperate zones of Asia, Europe, and South America, and summarized in table 2. It is also worth noticing that analogous to the observations

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on caiman and subtropical turtle fat the iodine value of the liver oil is definitely lower than that of the adipose fat, while Klenk (1933a) found approximately the same iodine value for the adipose and liver oil of *Rana temporaria* in the temperate zone. Further investigation will be needed to see if this unexpectedly low degree of unsaturation of the liver oil is another effect of the Henrique-Hansen law. The other constants are of the same order of magnitude as those reported for reptiles (Fromm *et al.*, 1957) and for the fat of other toads and frogs, cf. table 2.

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TABLE 2
Literature data on amphibian fat

Species	Organ	Yield % of Organ	M. P. °C	n _D ^t	Saponifica- tion Value	Iodine Value	Nonsap. % of Fat	Reference
<i>Bufo arenarum</i>	Fat	—	—	—	198	82.6	0.58	Cattaneo and Sutton (1952)
<i>B. melanostictus</i>	Fat	—	2.5-13	1.4660 ^{35°}	197.8	77.2	0.47	Tsukamoto and, Ohtaki (1951)
	Body	—	—	—	—	—	—	—
<i>B. bufo japonicus</i>	Fat	—	—	1.4647 ^{40°}	181.3	104.4	7.94	Tsujimoto and Kobayashi (1921)
	Body	—	—	—	—	—	—	—
<i>Rana catesbeiana</i>	Fat	75	-5	1.4733 ^{30°}	192.77	135.38	0.87	Iwamoto and Kisegawa (1930)
	Body	—	—	—	—	—	—	—
<i>R. catesbeiana</i>	Fat	4	—	1.4774 ^{30°}	194.78	134.24	1.25	Takasaki and Yamamoto (1930)
	Body	—	—	—	—	—	—	—
<i>R. temporaria</i>	Fat	88-93	—	—	—	118-120	—	Klenk (1933b)
	Body	—	—	—	—	—	—	—
<i>R. temporaria</i>	Liver	—	—	—	—	115-117	6.7-6.9	Klenk (1933a)

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